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BY: Reece Conti Date: November 23, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Patent Application of: :
Yoshiaki Tanaka :
Conf. No.: 7840 : Group Art Unit: 2835
Appln. No.: 10/656,561 : Examiner: Anatoly Vortman
Filing Date: September 4, 2003 : Attorney Docket No.: 10844-32US
Title: Alloy Type Thermal Fuse and Material for a Thermal Fuse Element : (203058(C-2))

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reasons stated on the attached five sheets.

Respectfully submitted,

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November 23, 2005
(Date)

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The Examiner has finally rejected claims 1, 5, 9, 45, 49, 93 and 97 under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA), and particularly over JP 2001-266724 ("JP '724"), and has finally rejected claims 37, 41, 77, and 81 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of U.S. Patent No. 4,496,475 of Abrams ("Abrams"). Applicant submits that these rejections are clearly improper based on the errors in facts and omissions of essential elements required to establish a *prima facie* rejection, as set forth below:

The Prior Art and Claimed Compositions Do Not Overlap

1. The Examiner states that "the claimed ranges as recited in claims 1 and 5 are overlapping the aforementioned AAPA ranges" (page 3, paragraph 1 of April 13, 2005 Office Action). Further, in the final Office Action (paragraph bridging pages 2-3), the Examiner argues that the claimed concentration range of Bi is adjacent to the prior art range. However, although the ranges *per se* of two of the three elemental components (In and Sn) indeed overlap, the overall alloy compositions do not overlap, as demonstrated in the liquidus projection diagram attached to the Request for Reconsideration filed July 12, 2005.

A liquidus projection diagram is a graphical representation of the elemental composition of a ternary alloy which portrays the concentrations of all three components at one time. Since the concentrations of all three components are critical, it is easier and more accurate to compare the liquidus projection diagrams than the numerical ranges individually. Thus, a liquidus projection diagram (which graphically represents the claimed composition) is a proper way to compare the alloys and demonstrates that the claimed and prior art compositions as a whole do not overlap.

In a ternary alloy, the concentrations of all of the components are critical to determining whether the compositions overlap. In this case, the concentration of the third elemental component (Bi), which does not overlap with that of the AAPA, results in an overall composition which does not overlap in the AAPA and presently claimed alloys. Thus, since the overall compositions themselves do not overlap, the claimed and prior art alloys would not have been expected to have the same properties.

No Motivation is Shown to Modify JP '724 for Any Desirable Purpose

2. The Examiner contends that a *prima facie* case of obviousness exists when the ranges in a claimed composition are close enough to those in the prior art that one skilled in the art would have expected them to have the same properties (top of page 3 of final Office Action). In support of this argument, the Examiner states that it would have been obvious to one having ordinary skill in the art at the time of the invention to have selected the claimed ranges for In, Bi, and Sn, since this would have been discovering an optimum value of a result effective variable.

However, according to MPEP § 2142, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify a prior art reference, there must be a reasonable expectation of success, and a teaching or suggestion of all of the claim limitations must be found in the reference. The teaching or suggestion to make the modification and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. No such teaching or suggestion is found in JP '724, and the rejection therefore lacks these essential elements of a *prima facie* case for the reasons set forth below.

(a) The Examiner has not demonstrated where any motivation to alter the ranges appears in the reference. Specifically, the Examiner has not shown, why, based on JP '724, one would have expected any positive changes to result from routine experimentation or modification of the elemental ranges which would have led one to determine that the claimed ranges were optimum. In fact, the Examiner only appears to rely on Applicant's description of JP '724 and does not refer to any specific sections of the reference at all (i.e., no motivation has been shown for any desired purpose).

(b) In order to arrive at the claimed Bi concentration from that recited in JP '724, one skilled in the art, while experimenting with the JP '724 alloy, would have had to increase the concentration of Bi from the JP '724 range of 7-12 % to the claimed range of more than 12% to 33%. However, JP '724 specifically teaches away from such an increase by teaching in paragraph [0013] that when the concentration of Bi is greater than 12%, the alloy is brittle and it becomes difficult to draw the alloy into a thin wire having the desired diameter. Thus, JP '724 completely teaches away from the proposed modification, and no reasonable expectation of success has been demonstrated.

(c) Further, the broad alloy of JP '724 contains 7-12% Bi. However, the preferred alloy composition of JP '724 contains 7-9% Bi, and the most preferred alloy of JP '724 contains 7.45% Bi. Thus, preferred Bi concentrations are at the bottom of the JP '724 range. That is, any optimization of this range by JP '724 points away from modifying the alloy to increase the Bi concentration to the claimed range of greater than 12% to 33% (i.e., above the disclosed range of JP '724). This further demonstrates that motivation is lacking because JP '724 teaches away from the claimed range.

(d) Finally, the Examiner argues that it would have been obvious to have selected the claimed ranges for In, Bi, and Sn since this would have been discovering an optimum value of a result effective variable. To the contrary, the claimed range of greater than 12% to 33% Bi would not have been an optimum value based on the teaching of JP '724. Rather, a Bi concentration of greater than 12% would have resulted in an alloy composition which was, in view of JP '724, inferior to that disclosed.

There Can Be No Motivation to Modify to Obtain Negative Results

3. As explained above, the suggestion to modify the prior art reference must be found in the reference itself. Applicants maintain that it would not have been obvious to modify the prior art ranges to provide an alloy which exhibited inferior properties to the original alloy. Specifically, modifying the JP '724 alloy to produce a composition which falls within the claimed Bi range, that is, increasing the Bi concentration to greater than 12%, would result in an alloy exhibiting inferior ductility and the inability to be drawn into a wire of the desired diameter. Thus, the proposed modification would have yielded negative results.

4. Further, JP '724 teaches in the abstract that the purpose of the invention is to provide an alloy type thermal fuse which can be drawn to a thin wire having a diameter of about 300 $\mu\text{m}\phi$. MPEP § 2143.01 states that a proposed modification cannot render the prior art unsatisfactory for its intended purpose. Since modification of the JP '724 alloy to increase the Bi concentration would affect the ductility and make the material unable to be drawn into a wire having the desired diameter (and thus unsatisfactory for its intended purpose), this proposed modification would not support a *prima facie* case of obviousness.

Criticality of Sn Concentration Has Been Shown

5. MPEP § 2144.05 also states that differences in concentrations will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. In the present case, the concentrations of the component elements are indeed critical to the resulting alloy. For example, as explained in the Request for Reconsideration filed July 12, 2005 (pages 3-5), using the claimed alloys ensures that the fuse element can be concentrically fused off, regardless of the width of the solid-liquid coexistence region. When alloy compositions falling outside of the claimed ranges are used, these results are not necessarily observed. Therefore, the concentrations of the component elements are indeed critical to the present invention, and do support patentability.

The Combination of AAPA and Abrams Does Not Result in the Present Invention

6. Regarding the rejection based on the proposed combination of AAPA and Abrams, the Examiner argues (see page 4, paragraphs 2-3 of April 13, 2005 Office Action) that JP '724 teaches thermal fuses having film electrodes made of a conductive paste comprising silver, but not that the paste contains a binder and silver particles. However, the Examiner contends that Abrams teaches a conductive paste containing silver particles and a binder for forming conductive bodies on a substrate, and concludes that there would have been a motivation to use the paste of Abrams for forming the electrodes of JP '724 to enhance mechanical and electrical properties and reduce production cost.

In order for a claim to be rendered *prima facie* obvious over a combination of references, the proposed combination must teach or suggest all of the claimed elements, and any motivation to modify the proposed combination must be found in the references themselves. As previously explained, there is no motivation to modify JP '724 to arrive at the claimed alloy, and the combination with Abrams does not cure this deficiency in the primary reference.

Accordingly, even if the proposed combination of the AAPA and Abrams were proper, the combination would result in an alloy type thermal fuse in which a pair of film electrodes are formed on a substrate by printing conductor paste containing silver particles and a binder, and in which the material for the thermal fuse element is an alloy composition containing 7 to 12% Bi. However, there would have been no motivation based on JP '724 or Abrams to adjust the concentration of Bi to fall within the claimed range of greater than 12% to 33%, for the reasons

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set forth previously. Therefore, no *prima facie* case has been established, and the rejection based on AAPA and Abrams is clearly deficient.

Conclusion

In view of these remarks, it is respectfully submitted that the above errors of fact and omissions of essential elements to establish *prima facie* obviousness render the outstanding rejections improper. Withdrawal of the rejections and a Notice of Allowance are respectfully requested.